

Waves – Doubler

Software Audio Processor

User's Guide



Chapter 1 – Introduction and Overview

The Waves **Doubler** is a digital audio effects processor that replicates the incoming audio signal to another 2 or 4 voices. Each voice can be changed in Gain, Pan, Delay and Tune (Pitch). This achieves a wide range of colors of classic sounds that were popularized in the 1980's by the use of digital hardware units that were designed to create harmonies but were more commonly used for pitch-shifted doubling.

The main effect is “Enriching the sound”. Often it is used to double vocals or guitar tracks. For example, let's say you have a vocal or instrument track that you want to “open up”. Take voice 1, detune it down four Cents and pan to the right. Take voice 2, detune it up four Cents and pan to the left. Setting the voice's gain at about –12dB already makes a big difference; bringing it up to –6dB should make it wide open. Now, changing the delay time of each voice and further offsetting and modulating the detune will further change the color of the sound. Running a track through the Doubler's presets is a good way to get acquainted with the range of sounds of the Doubler.

The essential difference between the Doubler and other pitch modulation and delay effects is mostly related to the Doubler's ability to detune while preserving audio duration. In Phasers, Flangers and such, the modulation changes the delay and duration of the processed sound, producing a shifting comb-filtered effect. In the Doubler, the sound is decorrelated by the initial detune and the tuning can be further modulated. The effect resembles that of a doubled take rather than mixed with a modulated version of the source.

The Doubler offers Two-Voice and Four-Voice components in:

- Mono to Mono
- Mono to Stereo
- Stereo to Stereo

The Doubler controls consist of per-voice control strips, direct signal controls, EQ, and global master controls. The basic Gain, Pan, Delay and Detune can be controlled using the Doubler's Graphs.

The Doubler can be used on an auxiliary bus to which multiple audio sources can be sent. Using the Doubler as a type of “Wet” sound that excites several tracks in the mix works really well, and is very DSP efficient.

The Doubler works great as an insert and allows you to adjust the direct gain and pan. When inserting on a mono track, the full effect is reached by inserting the Doubler Mono to Stereo plug-in. The mono component can work and “hot-switching” to the mono to stereo will inherit the settings from the mono to mono component.

Read on to get acquainted with the Doubler's controls and displays.

Chapter 2 – Controls and Displays.

The Doubler offers a selection of controls and displays as an interface to the DSP algorithm. This chapter lists the different controls and displays and details the properties of each.

CONTROLS

Per-Voice Control Strips

Each voice control strip offers the following controls:



ON/OFF: Default: On.

Turns the voice on or off.

GAIN: 0 to –48dBFS. Default: –12.

Sets the gain of the voice in relation to the other voices. The master gain can further change the actual output gain of all voices.

PAN: –45 to +45 degrees. Default: V1 22.5, V2 –22.5, V3 45, V4 –45. +45 degrees is fully right. –45 degrees is fully left. 0 is in the middle.

DELAY: 0 to 100 milliseconds. Default: 8ms.

Specifies the delay of the voice in relation to the direct signal. Note that the lowest value possible depends on the settings of the Align Direct and Range parameters. When the direct signal is aligned, the minimal delay possible at any range is 0 because the direct signal is delayed to align with the natural latency. When the Direct signal is real time, the minimal delay for range 80Hz is 8ms and for 20Hz is 14ms.

FEEDBACK: 0 to 100 percent. Default: 0%.

Specifies the percentage of gain to be fed back to the input. *Be careful when setting values above 25%.* These can lead to run-away feedback and loud noises that can harm delicate equipment.

OCTAVER: On/Off. Default: off.

This switch shifts the voice 1 octave down along with all the other settings. The button will light a downward arrow to indicate that the Octaver is On.

DETUNE: –100 to +100 cents.

100 cents equals a semitone. Use this control to set the voice's detune in relation to the source. Slight detunes of 2 to 12 cents tend to sound relatively in tune while higher values begin to sound off and out of tune.

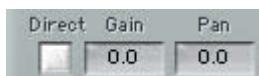
MODULATION DEPTH: -200 to +200 in cents. Default: 0.

Positive values will start by modulating upwards, negative values will start off modulating downwards. The modulation will always occur around the voice's nominal detune so if you set a detune of 10 and a Mod Depth of 10, the voice will begin by going upward 10 cents and then downward 20 cents, reaching 10 cents below the nominal detune.

MODULATION RATE: 0.1 to 200Hz. Default: 1Hz.

This value sets the voice's pitch modulation rate. At 1Hz the modulation will complete a full cycle in 1 second.

The Direct signal controls



ON/OFF: Default: On.

Turns the voice on or off.

GAIN: 0 to -48dBfs. Default: -12.

Sets the gain of the voice in relation to the other voices. The master gain can further change the actual output gain of all voices.

PAN: -45 to +45 degrees. Default: V1 22.5, V2 -22.5, V3 45, V4 -45.

+45deg is fully right. -45deg is fully left. 0 is in the middle. In Stereo sources the Pan for the direct will actually behave as a Rotation control for the whole stereo image.

EQ Controls



The Doublers EQ section offers a Hi Shelf and Low Shelf filter. These filters will affect the Doubler's voices, but not the direct signal. The controls for the filter are as follows:

ON/OFF: Default: On.

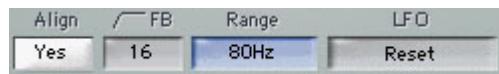
These turn the filter on and off allowing a quick A/B comparison to an EQ setting in relation to no EQ. Double clicking on the Graph markers will also turn the filter on and off.

GAIN: +12dB to -24dB

The Shelf can boost all that beyond its corner frequency by up to 12dB. It can cut down much lower than that, down to -24dB, at which point the filter floor drops to make a cut filter.

FREQUENCY: Low Shelf Cutoff 16Hz to 1600Hz. Default: 156Hz.
Hi Shelf 1000Hz to 21000Hz Default: 5990Hz.

Master controls include:



ALIGN DIRECT: On/Off. Default: Off.

When set to On, this control delays the direct signal in order to align it to the Voices' inherent latency. With the Align On, you can reach a relative delay of 0ms between the direct signal and the Voices. The Voices' inherent latency depends on the range: at 80Hz, the Voices' inherent latency will be 7ms and at 20Hz, it will be 24ms. When the Align direct is Off, the plug-in will not add delay to the direct so it will be aligned with the Track's original time, and the minimum relative delay between the Voices and the direct is limited to the Voices' inherent delay.

HI PASS FEEDBACK: 16Hz to 12000Hz. Default: 16Hz.

Sets the Feedback's Hi Pass filter cutoff frequency.

RANGE: 80Hz/20Hz Default: 20Hz.

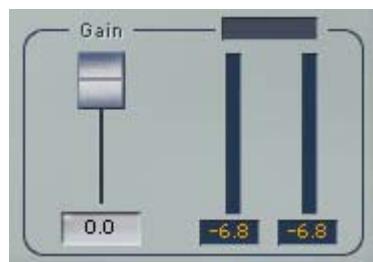
Detuning lower frequencies requires higher inherent latency for the Voices. The Range control specifies the lowest frequency that can be detuned with no artifacts, and at the same time sets the lowest inherent latency for the voices. Lower Range means higher latency.

If low latency is not a concern it is safer to work with the wider Range, down to 20Hz (latency is 24ms). When low latency is a concern, and the input signal consists of frequencies above 80Hz (such as guitars and lead vocals), set the Range to 80Hz, and the inherent latency will likewise be smaller. 20Hz Range should be used for Doubling bass instruments and will perform more purely on complex full range signals such as mixed sources.

MODULATION RESET.

Sometimes interesting sounds can be achieved by synchronized modulations, but when you have to set the rate and depth individually, they will definitely go out of sync. Click the Mod Reset to make them start together in perfect sync. This control is also automateable and can be used to reset the modulators to start at the exact position in selected cues of your session so they sound the same each time.

Master Output and meters



MASTER OUTPUT GAIN: 0.0 to –infinity. Default: 0.0dB.

The Master Gain control will affect the total Doubler output, including the direct path. When there is a generally good-sounding setup that occasionally clips the output, you can adjust the gain in order to eliminate clipping.

OUTPUT METERS show the plug-in output and under the meters there are peak counters. These counters will show the peak value until reset by clicking on the meter or counter.

CLIP LIGHT lights in red whenever output clipping occurred. Lower the output gain to avoid clipping. Click it to Reset.